ART. VI.—An Alphabetical List of the Genera and Species of Sponges described by H. J. Carter, Esq., F.R.S., together with a Number of his More Important References to those of other Authors, with an Introductory Notice.

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I.—Introductory Notice.

Mr. Carter is, and has for a long time, been justly recognised as the oldest and most experienced of all those who have made a special study of the sub-kingdom *Porifera*, or

Sponges.

He produced his first paper on the subject, entitled "Notes on the Species, Structure, and Animality of the Freshwater Sponges in the Tanks of Bombay," whilst stationed at Bombay as a surgeon in the army. This paper was published in the "Transactions of the Bombay Medical and Physical Society" of 1847 (No. 8), and was reprinted in the "Annals and Magazine of Natural History (Series 2, vol. I) in the following year. The last paper on the subject which appeared from his pen, on a collection of sponges from the Mergui Archipelago, was published only last year in the Journal of the Linnean Society of London, and in the same year he published four other papers in the "Annals and Magazine of Natural History."

In the forty-one years from 1847 to 1887 (inclusive), Mr. Carter has published no less than 125 papers on sponges, a far greater number than any other author. These papers treat of nearly 800 distinct species of sponges, arranged under over 200 distinct generic names. By far the greater number of these 800 species are described by Mr. Carter for

the first time.

Although both his first and last papers were published elsewhere, it was a very rare exception for Mr. Carter to publish anywhere except in the "Annals and Magazine of

Natural History," which renders the study of his papers, and the production of such a list as the present, a far easier task than it would otherwise have been.

It is much to be regretted, however, that Mr. Carter has never been able to collect his numerous observations and bring them together in a more coherent form. As it is, they remain scattered about in a state of almost hopeless confusion through the 125 papers above mentioned, and without the assistance of some such list as the present, it is

difficult to gain a correct idea of his work.

The greater portion by far of Mr. Carter's work is purely systematic, and consists in the description of new species; but he has also written on the Anatomy and Embryology of the group. He commenced, as we have seen, in 1847, with the study of the Freshwater Sponges, and in the series of papers which he published on this subject, there are some extremely important observations which have hardly attracted as much attention as they deserve. This might be said of a good many of Mr. Carter's observations, and it is possibly due to the fact that they are mostly more or less buried in a mass of purely systematic description, which none but a specialist would ever think of reading. Mr. Carter is a wonderfully careful and accurate observer, and considering the early date at which his observations on Spongilla were made, when the study of sponges was practically virgin soil, his results are most remarkable.

Between the years 1849 and 1868 only two papers appeared in his name, but from 1868 onwards, until the middle of 1887, not a year has passed in which he has not published something about sponges. The year 1874 was marked by special activity, for in this year he commenced the publication of his "Descriptions and Figures of Deep Sea Sponges and their Spicules from the Atlantic Ocean, dredged up on board H.M.S. Porcupine,"* and in the same year he published two important papers on the Development of Marine Sponges.† The Porcupine reports are decidedly the most valuable of Mr. Carter's systematic papers, and the papers on the Development of Marine Sponges are undoubtedly the most important of his more purely biological works.

The progress of the work on the *Porcupine* sponges was interrupted by the publication, in 1875, of the "Notes

^{*} A. M. N. H. Ser. 4. Vol. xiv, p. 207, et seq. † A. M. N. H. Ser. 4. Vol. xiv, pp. 321, 389.

Introductory to the Study and Classification of the Spongida."* The publication of these notes appears to have been suggested to Mr. Carter by the obvious necessity of having some definite system upon which to arrange his numerous species. The plan of the "Notes" was a comprehensive one. They were to consist of three parts, and were to form a kind of general guide to the whole subject, which was rapidly becoming more and more complex. The three parts were to be—(1) Anatomy and Physiology; (2) Proposed Classification of the Spongida; (3) A further Division into Sub-families, Genera and Species, so far as our knowledge extends.

The first part was a general account of the anatomy and physiology of sponges, including those structures, viz., the skeletal elements, upon which the subsequent classification was based. The second part contains Mr. Carter's scheme of classification, which is sufficiently well known to all spongologists, but which has never obtained general acceptance. He himself, however, has adhered to it systematically, and its appearance at this stage was therefore of great importance to the student of his papers. The promised third part, which should have been a kind of coping stone to the whole structure, most unfortunately never appeared. After the publication of the second part, Mr. Carter returned to his work on the *Porcupine* Sponges, the descriptions of which he completed in 1876.

Between 1876 and 1885 there appeared a long series of miscellaneous papers on sponges, which need not here be specially noticed. In 1885, however, an event took place of special interest to Victorian Naturalists, namely, the appearance of Mr. Carter's first paper† on the splendid series of sponges from the neighbourhood of Port Phillip Heads and Western Port, collected and sent to England by Mr. J. Bracebridge Wilson, M.A. Henceforth, Mr. Carter devoted almost all his energy to working out and describing these sponges, and he published a series of fifteen papers upon them in the Annals and Magazine of Natural History. In these fifteen papers he records 211 species and varieties, nearly all of which were new to science and all collected by Mr. Bracebridge Wilson.

After the conclusion of this laborious work, in 1887, Mr. Carter published two noteworthy papers of a more strictly

^{*} A. M. N. H. Ser. 4. Vol. xvi, pp. 1, 126. † A. M. N. H. Ser. 5. Vol. xv, p. 107.

biological character—the first "On the Position of the Ampullaceous Sac and the Function of the Water Canal-System in the Spongida;"* and the second, "On the Reproductive Elements of the Spongida."† The latter was his last sponge paper in the Annals and Magazine of Natural History, in which he had now been publishing for 41 years. It was succeeded by his report on the sponges of the Mergui Archipelago, in the Journal of the Linnean Society of London, which, however, Mr. Carter informs me was written so far back as 1883.

As Mr. Carter has at length been obliged by the state of his health to cease working at his favourite subject, and as we shall probably have no more papers on sponges from this indefatigable and able naturalist, it has occurred to me that I might perhaps benefit other naturalists as well as myself by the publication of a complete list of all the genera and species which he has described. These are arranged in alphabetical order, with full references to the places where the descriptions are to be found, and it is hoped that the list will serve as an index to Mr. Carter's papers.

The list of genera and species was compiled whilst I was working in the Natural History Department of the British Museum, and it contains 985 references, every one of which was obtained from the original paper. In addition to the species described for the first time by Mr. Carter himself, which are distinguished by the presence of his name attached to them, the list contains a number of his more important references to the species of other authors. Care has been taken to give all the names exactly in the form in which they appear in Mr. Carter's works, and although subsequent research will probably necessitate considerable modification in Mr. Carter's nomenclature, I have felt that it would be out of place to attempt any such modification here.

It may be of especial interest to Victorian Naturalists to observe, that more than a quarter of the species and varieties mentioned in the list are recorded by Mr. Carter from the neighbourhood of Port Phillip Heads and Western Port.

^{*} A. M. N. H. Ser. 5. Vol. xix, p. 203.

[†] A. M. N. H. Ser. 5. Vol. xix, p. 350.

Jour. Linn. Soc. Vol. xxi, p. 61.

II.—Alphabetical List.

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	rugolineata	"	A.M.N.H.	5, xvi, p. 36	
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Aleyone	ellum corbicula		A.M.N.H.	4, xii, p. 36	
,,	speciosum		A.M.N.H.	4, xii, p. 36	7
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"	nigrocutis	"	A.M.N.H.		0
, ,,	stellifera	"	A.M.N.H.	5, iii, p. 34	-
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"	capensis	"	A.M.N.H.	5, viii, p. 11	
"	carnosa	α .	A.M.N.H.	4, xvi, p. 19	
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"	chalinoides	Carter	A.M.N.H.	4, xvi, p. 19	
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EXPLANATION OF ABBREVIATIONS.

A.M.N.H.—Annals and Magazine of Natural History.

J.R. Micro. Soc. - Journal of the Royal Microscopical Society.

Jour. Linn. Soc.—Journal of the Linnean Society of London—Zoology.

P. Acad. Nat. Sci., Philad.—Proceedings of the Academy of Natural Sciences of Philadelphia.

Phil. Trans. Roy. Soc.—Philosophical Transactions of the Royal Society of London.